Longitudinal Study of Astronomy Graduate Students

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Background

- Resolution adopted at WIA 2003
  - "The American Astronomical Society should commission immediately a longitudinal study of young women in astronomy
  - A similar group of men should be used as a comparison sample
  - Both subjects that remain in the field and those that leave the field should continue to be tracked for the duration of the study.
  - The AAS should commit to continue this study for at least 10 years
  - One goal of this study would be to measure whether there is differential attrition of women from the pipeline and if so, to learn the reasons for it."
- Funded by AAS Council and AIP in January 2007

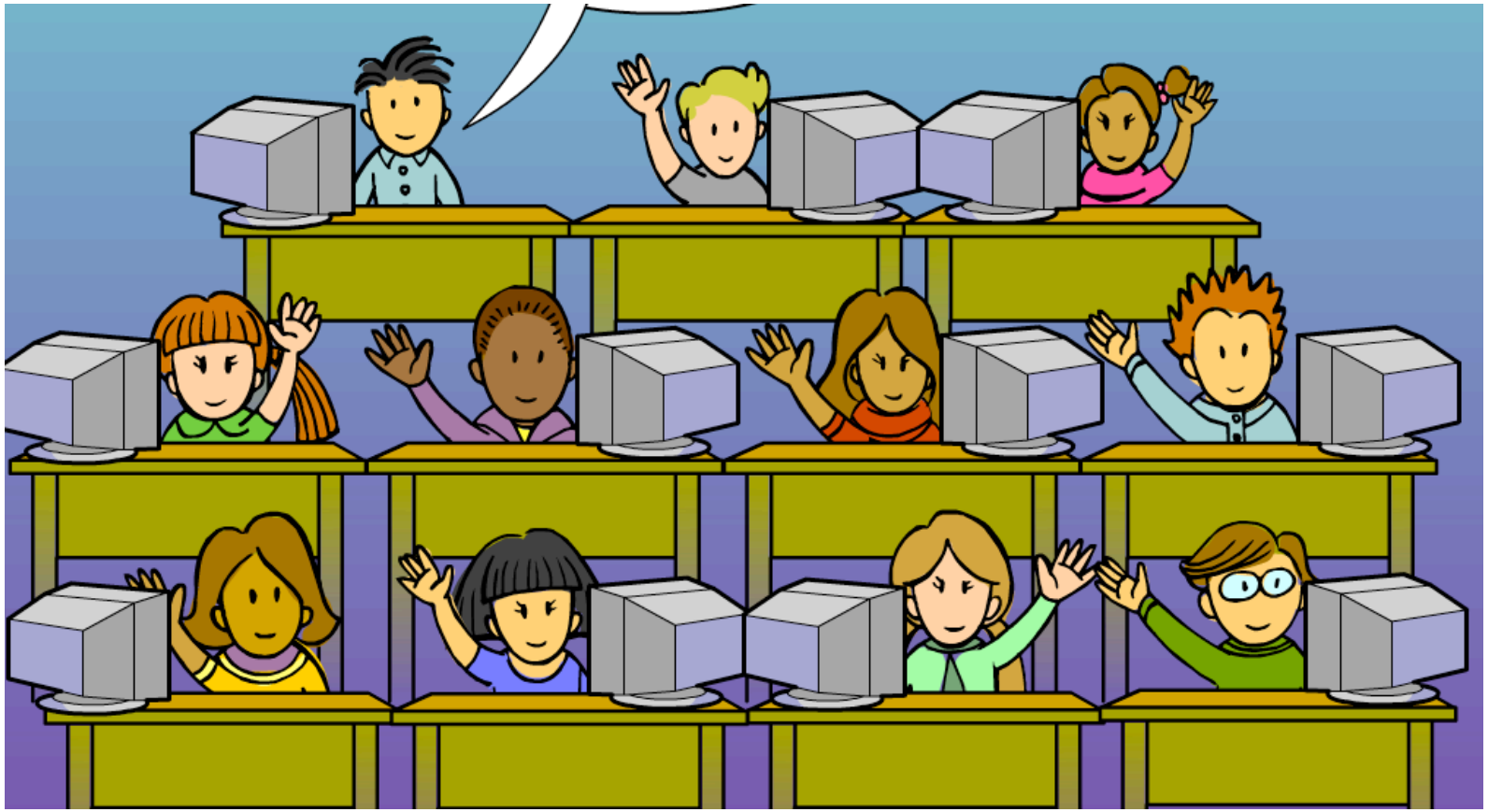
Background

- Working group convened by CSWA
  - Pat Knezek
  - Audra Baleisis
  - Susana Deustua
  - Stefanie Wachter
  - Jennifer Neakrase
  - Rachel Ivie
- Data collection began in July 2007

Survey Methodology

- AAS's junior membership list
- Astronomy and astrophysics graduate students from AIP surveys
- 2056 names collected (grad students in 2006-07)
- Multiple contacts via e-mail and paper mail
- 1576 responses (not all eligible for analysis)
- 800 agreed to participate in future (41% female)

Respondents



Number of Respondents Used in Analysis

- Females: 447
- Males: 696
- Total: 1,143

Demographics

- Female: 39%
- Mean age: 28
- Full-Time: 97%
- Mean Length of Time in Program: 3.4 years
- U.S. Citizen: 77%
- Mothers have college degrees: 64%
- Fathers have college degrees: 71%
- Planning a Doctorate: 91%

Bachelor's Degrees

- Physics: 53%
- Physics and Astronomy: 25%
- Astronomy: 13%
- Other: 10%

Financial Support

- Research Assistantship: 57%
- Teaching Assistantship: 21%
- Fellowship: 16%
- Other: 6%

Imposter Syndrome

- “Believing that one's accomplishments came about not through genuine ability, but as a result of having been lucky, having worked harder than others, or having manipulated [managed] other people's impressions” (Langford and Clance, 1993)
- Scale adapted for use with astronomy students
- Gender difference predicted
- May be related to attrition

Imposter Scale Items

- People believe I am more competent
- I am afraid others will discover how much knowledge or ability I lack
- In my career through some kind of mistake
- I succeed because I work harder than others
- Success is caused by my high ability
- Highly confident I will succeed in my career
- I'm at least as smart as my peers

Other items

- Climate in my department is welcoming
- Skills to develop into a good researcher
- Skills to develop into a good teacher
- Adequate access to facilities and equipment to develop into a good researcher
- Did you feel you were being mentored

Analysis

- Analyzed with multivariate logit models
- Looking for effects that are independent of other effects

- Independent variables
  - Being mentored
  - Length of time in program
  - Type of support
  - Citizenship
  - Sex
  - Full-time v. part-time

Mentoring Matters

72% felt mentored

Students Who Feel They Are Being Mentored Are More Likely to…

- Find the overall environment in their department to be welcoming
- Report having the skills to develop into a good researcher
- Report having access to adequate facilities/equipment to develop into a good researcher

- Be confident that they will succeed in their future career
- Report that they are at least as smart as their peers

And Less Likely to…

- Report feeling like they are in their current career position through some kind of mistake

Who Is More Likely to Feel Mentored?

- Full-time students
- Students with temporary visas
- The longer a student is in a program, the less likely they are to report being mentored

Length of Time in Program Matters

The Longer a Student is in a Program…

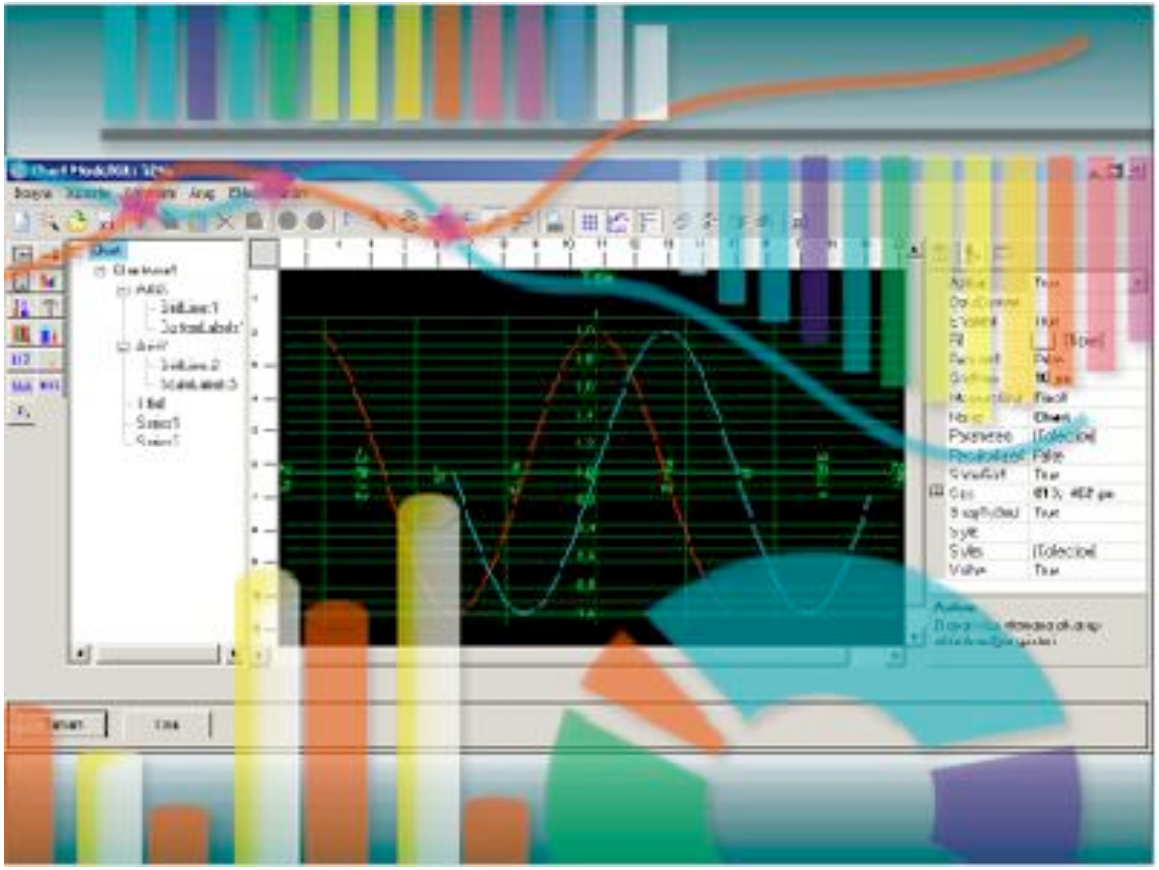
- The more likely they are to report that they are afraid others will discover how much knowledge and ability they lack
- The less likely to be confident that they will succeed in their future career
- The less likely to report having the skills to develop into a good researcher

Gender Matters

Gender Differences

- Females are less likely than males to report that the overall environment in their department is welcoming
- Females are less likely than males to feel confident that they will succeed in their future careers
- Females are more likely than males to report that sometimes they are afraid others will discover how much knowledge or ability they lack

- Females are less likely than males to say that the major cause of success in their life is because of their high ability
- Females are more likely than males to say that when they succeed it is because they work harder than others



Findings from Open-Ended Questions

What has been a hindrance to your success?

- Most common response was to talk about personal shortcomings, although women were more likely to do this than men (29% v. 21%)
  - Taking on too many projects. Being a perfectionist. Having difficulties in coming up with new research ideas (Female)
  - Sometime I feel I'm not smart enough for doing this (Female)
  - Fear of and failure to ask questions when unsure. Lack of confidence. Fear of being wrong. Intimidation by and dislike of aggressive intellectual atmosphere of astronomy (Female)
  - My short attention span (Male)
  - My test taking abilities leave much to be desired despite my knowledge of the subject (Male)

Hindrance, part 2

- Women more likely to cite problems with their advisors (12% v. 8%).
- Women more likely to say that they lack background (8% v. 4%).
- Other than advisor, men more likely to cite external factors (10% v. 16%)
  - Lack of resources, opportunity, time, support, funding
  - Problems with research or delays in research

What has helped you succeed?

- Generally, women more likely than men to mention other people
  - One of the most common responses was advisors (28% of women and 23% of men).
  - Women more likely to mention other faculty members (22% v. 10%).
  - Women more likely to mention peers (27% v. 12%).

Next step: funding for follow-up

For more information

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